

CLAIMS

1. Use of retinoic esters of hyaluronic acid as stem cells pro-differentiating agents.
2. Use according to claim 1, wherein such esters are characterized in that they have a degree of substitution with retinoic acid is comprised from 0.00001 to 0.5.
3. Use according to claim 2, wherein said degree of substitution with retinoic acid is comprised from 0.002 to 0.1.
4. Use according to claim 1, wherein such esters are mixed esters of hyaluronic acid with butyric and retinoic acids.
5. Use according to claim 4, wherein the mixed esters are characterized in that they have degree of substitution with butyric acid ranging from 0.05 to 1.0, a degree of substitution with retinoic acid ranging from 0.002 to 0.1 and a ratio between the degree of substitution with butyric acid and retinoic acid (DS RA/DS BA) of at least 6.
6. Use according to claim 1, wherein said stem cells are mammalian.
7. Use according to claim 6, wherein said mammalian are chosen among: H. sapiens, primates, higher primates, rodents, swine, bovines.
8. Use according to claims 1-7, wherein said stem cells are of embryonic or somatic origin.
9. Use of polysaccharidic esters of retinoic acid for preparation of medicaments with cardiogenic pro-differentiating activity on stem cells.
10. Use according to claim 9 for preparation of medicaments with a cardiogenic pro-differentiating activity.
11. Use according to claim 10 for preparation of drugs for treatment and prevention of myocardial damages and of cardiomyopathies
12. Use according to claim 11, wherein the myocardial damage is myocardial infarction.
13. Process for in vitro preparation of cardiomyocytes essentially comprising a step of incubation of stem cells with retinoic esters of hyaluronic acid and optionally a selection of the contractile units comprising said cardiomyocytes.
14. Process according to claim 13, wherein said retinoic esters are characterized

- by a substitution degree of hyaluronic acid with retinoic acid comprised from 0.00001 to 0.5.
15. Process according to claim 13, wherein such retinoic esters are mixed esters of hyaluronic acid with butyric and retinoic acids.
 16. Process according to claim 15, wherein such mixed esters are characterized in that they have a degree of substitution with butyric acid ranging from 0.05 to 1.0, a degree of substitution with retinoic acid ranging from 0.002 to 0.1 and a ratio between the degree of substitution with butyric acid and retinoic acid (DS RA/DS BA) of at least 6.
 17. Process according to claim 13, wherein said stem cells are autologous or heterologous.
 18. Process according to claim 17, wherein the selection is performed by means of "gene-trapping".
 19. Process according to claim 17, wherein said stem cells are chosen among: P19, D3 cells, R1 cells, GTR1 cells.
 20. Process for the selection of new molecules with cardiogenic-modulation activity comprising the process according to claims 13-19 and optionally a step for optimization of the selected molecules.
 21. Process for preparation of an in vitro cell model for cardiogenic differentiation of stem cells, essentially comprising a step of incubation of said stem cells with retinoic esters of hyaluronic acid alone or in combination with other substances, in suitable culture medium.
 22. Process according to claim 21, wherein such retinoic esters are characterized in that they have a degree of substitution of hyaluronic acid with retinoic acid ranging from 0.00001 to 0.5.
 23. Process according to claim 22, wherein such retinoic esters are mixed esters of hyaluronic acid with butyric and retinoic acids.
 24. Process according to claim 23, wherein such mixed esters are characterized in that they have a degree of substitution with butyric acid ranging from 0.05 to 1.0, a degree of substitution with retinoic acid ranging from 0.002 to 0.1 and a ratio between the degree of substitution with butyric acid and with retinoic acid (DS RA/DS BA) of at least 6.

25. Process according to claim 21, wherein said stem cells are chosen among: P19, D3, R1, GTR1, H1, H7, H9, H9.1 and H9.2 cells.
26. Process according to claim 21, wherein such incubation is followed by a step of selection of the contractile units comprising cells differentiated in cardiomyocytes.
27. A therapeutic method for treating heart failure in a patient in need of such a treatment characterised in that heterologous or autologous stem cells are treated "in vitro" or "ex vivo" with retinoic esters of hyaluronic acid.
28. A therapeutic method according to claim 27 wherein the degree of substitution of hyaluronic acid with retinoic acid is comprised from 0,00001 to 0,5.